Assignment 2

We discussed the idea of hardware components in the "How Computers Work: Hardware" lecture and discussed the idea of algorithms and libraries in the "How Computers Work: Software" lecture. Let us assume we wanted to build a real-life robot, where you are able to input instructions to complete many different tasks such as: moving around a space without running into walls, objects, or people; picking up and placing objects; identifying everyday objects and their basic uses; using objects as tools (e.g., using a broom to sweep, using a wrench to tighten/loosen screws, etc.); basic speech capabilities (i.e., it can both listen to take in certain commands and speak to notify when tasks are completed or for more clarification on tasks); etc. Please answer the following questions about such a robot. (Note, when answering these questions, you may simply list them out using bullet points instead of in paragraphs in order as this will make grading faster and easier).

1. What major hardware components would be needed to achieve at least some of the listed actions the robot should be able to perform? Make sure to think about everything needed to complete each action, e.g. it needs to "see" where it's going, it needs to walk, etc. (You do not need to list low-level components such as motherboards, servos, etc., just the high-level idea of each major necessary piece). List at least 5 major components:

2. While you are able to give certain instructions/commands and you have the hardware necessary to perform the tasks, we would need MANY libraries and frameworks on top of the hardware to actually carry out these tasks. Please list out as many library packages that you can think of that would be needed to perform the listed tasks. Please give a name or basic description of general "packages" of libraries, e.g. it will need to be able to walk so it will need libraries to: calculate distance, move servos and limbs, correct for imbalance (or imperfections in the floor), etc. List at least 1 library/framework that would be needed for each of the hardware components you listed above: